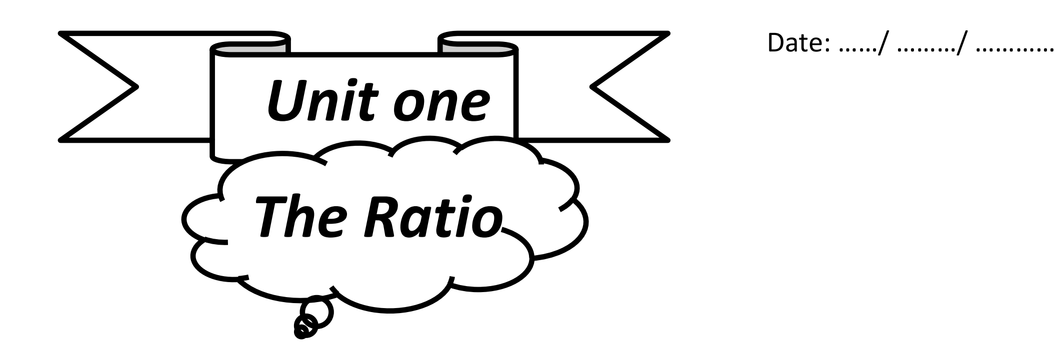


Date: ……/ ………/ …………

The ratio: comparing between two quantities of the same kind.

The ratio between a number and another number = ―――――― or First number: Second number

Remember that:

1) Perimeter of square = S × 4
2) Area of square = S × S
3) Perimeter of rectangle = (L + W) × 2
4) Area of rectangle = L × W
5) Circumference of circle = 2 r
6) Area of circle =

- The ratio between the side length of the square and its perimeter = 1 : 4
- The ratio between the perimeter of the square and its side length= 4 : 1
- The ratio between the side length of the equilateral triangle and its perimeter = 1 : 3
- The ratio between the perimeter of the equilateral triangle and its side = 3:1
- The ratio between the radius of the circle and its circumference = 1 : 2
- The ratio between the circumference of the circle and its radius = 2 π : 1
- The ratio between the diameter of the circle and its circumference = 1 :
- The ratio between the circumference of the circle and its diameter = π : 1

Transformations

- Km $\xrightarrow{\times 1000}$ m $\xrightarrow{\times 10}$ dm $\xrightarrow{\times 10}$ cm $\xrightarrow{\times 10}$ mm
- Kg $\xrightarrow{\times 1000}$ gm
- Year $\xrightarrow{\times 12}$ Month $\xrightarrow{\times 30}$ Days $\xrightarrow{\times 24}$ hours $\xrightarrow{\times 60}$ minutes $\xrightarrow{\times 60}$ seconds
- Weak $\xrightarrow{\times 7}$ Days
- LE $\xrightarrow{\times 100}$ piasters
- Feddan $\xrightarrow{\times 24}$ kirate $\xrightarrow{\times 24}$ sahm

Express the ratio in each of the following cases.

1) 10 black marbles and four blue marbles, express the ratio between all the marbles to blue marbles = …………. : ………………
2) 5 black marbles, 17 blue marbles, 10 brown marbles and 12 white marbles. Express the ratio of white marbles to all marbles = ………: ………
3) 11 blue marbles and 22 black marbles. Express the ratio of blue marbles to black marbles = …………: ……………
4) 12 white balls, 10 red balls, 7 green balls, and 5 blue balls. Express the ratio of :
   - Red balls to white balls = ………: ………
   - Blue balls to white balls = ………: ………
   - Red balls to all the balls = ………: ………
   - White balls to all the balls = ………: ………
5) ▽▽▽▽▽□□□

   Triangles to total = ………… : …………

Complete each of the following (in the simplest form

1) 6 : 10 = ……… : ………
2) 12 : 15 = ……… : ………
3) 20 : 30 = ……… : ………
4) 50 : 300 =……… : ………
5) 1.5 : 2.5 = ……… : ………
6) 4.5 : 90 = ……… : ………
7) – – = ……… : ………
8) The ratio is ………………………………………………………………
9) The ratio between the length of a side of a square and its perimeter = ……… : ………
10) The radius length of a circle: the circumference of the circle = ………: ………
11) The ratio between the perimeter of an equilateral triangle and its side length is ……… : ………
12) – – = ……… : ………
13) A school has 200 pupils , if 80 of them are girls, find the ratio between the number of boys to the number of girls ……… : ………
14) 3.2: $\frac{8}{}$ = ………: ………
15) The ratio between the lengths of two sides of a square is …… : ……
16) A square of side length 5 cm and a rectangle whose dimensions are 10 cm and 5 cm. find:
    a) The ratio between the perimeter of the square and the perimeter of the rectangle = ………… : …………
    b) The ratio between the area of the square and the area of the rectangle = ………… : …………
    c) The ratio between the length of the rectangle and its perimeter = ………… : …………

17) – – …….. : ………

18) : …… : ………

19) – : 0.5 = ………: ………

20) – : $\frac{2}{}$ = ……… : ………

21) The area of rectangle is 36 , and its width = 3 cm. find:

a) The length of the rectangle = …………… cm

b) The ratio between the width of the rectangle and its length

……

c) The ratio between the length of the rectangle and its perimeter.

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22) *5 kg: 500 gram =…… (1 : 100 or 1 : 10 or 10 : 7 or 10 : 1)*

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23) *12 hours : 2 days =….(1 : 2 or 6 : 1 or 1 : 4 or 1 ; 6)*

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24) *400 cm : 6 m =….(20 : 30 or 3 : 20 or 2 : 3 or 3 : 2)*

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25) *5 weeks : 25 days =….(1 : 5 or 5 : 7 or 7 : 5 or 5 : 1)*

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26) 6 kirats : 2 ½ feddans = ….(10 : 1 or 1 : 10 or 3 : 125 or 6 : 1)

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27) If a : b = 5 : 3 and a – b = 8 , then b =………. (6 or 8 or 10 or 12)

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28) If the ratio between Hany's age and his father's age is 2 : 7 and if Hany's age is 16 years , then his father's age equals……years (32 or 63 or 56 or 70)

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29) If the ratio between the perimeter of a rectangle and its length equals 8 : 3 and its perimeter equals 64 cm , then its length equals……………. (3 cm or 8 cm or 12 cm or 24 cm)

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30) 250 pt. : 7.5 pounds

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…………………………………………………………………………………………

31) 75 kirates : 16 sahms

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32) A salary of cleaning worker LE 400 monthly, He spends LE 340 and saved the remainder. Find:

a) The ratio between what the worker spends to his salary.

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b) The ratio between what he saves to his salary.

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c) The ratio between what he spends to what he saves

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33) A fruit seller sells one kilogram of apple for LE. 10, if the ratio between the price of apple to the price of banana is 5: 2, find the price of 5 kilograms of banana.

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34) A rectangle with width 3.5 cm and its length = 7cm, find:

a) The ratio between the length and its width.

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b) The ratio between the width to the perimeter.

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c) The ratio between the length and its perimeter

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The ratio among three numbers

1- Put each of the following ratios in its simplest form:

a- 36 : 48 : 84

b- 1.25 : 5 : 1.5

c- $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

d- 2.5 kg : 3000 gm : 4.5 kg

e- 12 L.E : 8 L. E : 6400 P.T

f- 3.2 m : 80 cm : 24 dm

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g- $\frac{1}{8}$ day : 6 hours : $1\frac{1}{2}$ day

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2- The ratio of the ages of three persons is 7 : 9 : 10 Find the real ages if their sum is 130 years.

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3- The ratio among the measures of the angles of a triangle is 3 : 7 : 8 Find the measure of each angle of this triangle.

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4- The ratio of the weights of three persons is 8 : 5 : 6 if the difference between the weights of the first one and the third one is 24 kg, find the weight of each one.

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5- The perimeter of a triangle is 108 cm. Find the lengths of its sides if thr ratio among the side lengths is 4 : 3 : 5

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6- A , B , C are three numbers. If A : B = 3 : 5 and B : C = 4 : 7 , Find A : B : C

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Applications on ratio (The rate)

The rate: the ratio between two quantities of different kinds

1- If a car consumes 60 liters of fuel to cover a distance of 600 km. Calculate the rate of consumption.

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2- If a car covered 220 km in 2 hr , calculate the speed of the car.

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3- A factory produces 5000 juice cans in 8 hours. Find the production rate per hour.

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4- A tractor ploughs 15 feddans in 5 hours.How many feddans does the same tractor plough in 4 hours?

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5- *A worker paints a wall of area $100m^2$ at 8 hours, then the rate of work =……m^2 / hr.*

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6- *A machine produces 500 m. of cloth in 2 hr , another machine produces 600 m of the same cloth in 2 and a half hours. Which one is better?*

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Unit Two

Proportion

The proportion: is the equality of two ratios or more

1- Complete each of the following:

a- The proportion is………………………

b- —— = —— = —— = —— = ——

c- —— = ——

2-Find the value of x in each of the following proportional sets:

a-6, 12, 25, X

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b-X, 16, 28, 32

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c-4.2, X, 1.3, 3.9

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3-The price of 4 feddans is L.E 5000 if you have L.E 20000 , then how many feddans can you buy?

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4-The height of a tree is 10.5 m and the height of its shadow is 7.5 Find the height of a house whose shadow length is 11.5 m at the same time.

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5- Atef bought 5 kg of orange, he paid L.E 15 How much money does he pay to buy 8 kg?

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6- If the price of 4 TV sets is L.E 5000 , then find :

a- The price of 3 sets.

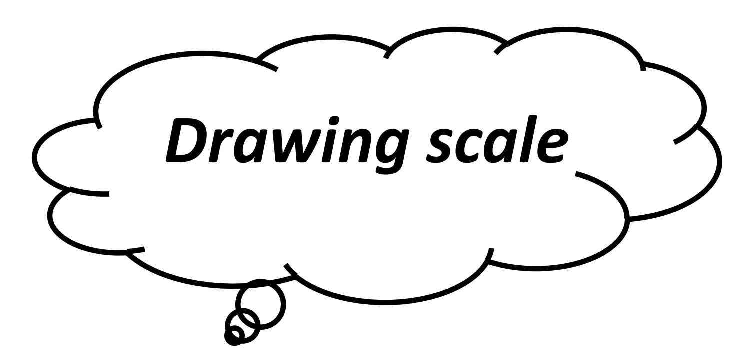
b- If you have L.E 10000 , How many TV sets can you buy?

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Rules:

Drawing scale = ——————

Length of reality (real length) = ——————

Length of drawing (drawing length) = drawing scale × real length

N.B. :

Both lengths should have the same units.

1-The distance between 2 cities is 80 km and the distance between them on a map is 8 cm. Find the drawing scale and what it means.

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2- A magnified picture of an insect of real length 0.5 mm was photographed. If the length of this insect in the picture = 7.5 cm, calculate the drawing scale, and what it means.

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3- A magnifying glass is used to magnify an insect of real length 0.5 mm If its magnified length is 35 cm, find the ratio of magnification.

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4- The distance between two cities on a map is 3.6 cm and the map was drawn with a drawing scale 3 : 5000000 . Find the real distance between the two cities in kilometers.

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5- Abuilding of height 80 m was pictured by a scale 1 : 10000, find the height of this building in the picture.

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7- The drawing scale of a map is 1 : 5000000 , Find :

a- The map distance if the real distance is 150 km.

b- The real distance if the map distance is 4.5 cm

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8- A piece of land in the shape of an equilateral triangle of perimeter 180 m is drawn in a picture as a triangle of side length 4 cm , then the ratio of reduction is……………………

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9- A model for a football playground is drawn with a drawing scale 1 : 500 the dimensions of the playground in the model are 24 cm and 10 cm Find

a- The area of this playground in square meters.

b- The perimeter of this playground in meters.

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Proportional division

Proportional division means dividing something (money,land,….) in a given ratio.

1- A man wishes to divide L.E 1000 between his kids Rana and Sally in a ratio 3: 2 what is the share of each?

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2- The ratio between the number of boys to the number of girls in a class is 4: 3 If there are 42 pupils, Find out the number of boys and girls.

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3- The daily production of 3 oil wells is 17600 barrels. The 1st produces ¾ of the production of the 2nd and the 3rd produces 3/5 of the production of the first. Find the production of each well.

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4- Find the area of a rectangle of perimeter 28 cm if the ratio between its dimensions is 2 : 5

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5- A charity distributes an amount of money among three poor families in the ratio 4 : 5 : 7 Find the share of each family if the share of the third family exceeds the share of the first family by 270 L.E

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6- Ehab and Fady started a computer shop. Ehab paid 3/5 of what Fady paid. At the end of the year, the net profit was L.E 2400. Find the share of each.

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7- Adel, Ahmed and Samy invested L.E 12000, L.E 16000 and L.E 2000 respectively to start a kindergarten. After one year they made a profit of L.E 6480, but they paid ¼ of it for taxes and kept 2/5 of it as savings. Find the net profit of each.

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8- A father divides *L.E 27000 among his two sons and 4 daughters such that the share of each boy is double the share of each daughter. Find the share of each of the sons and daughters.*

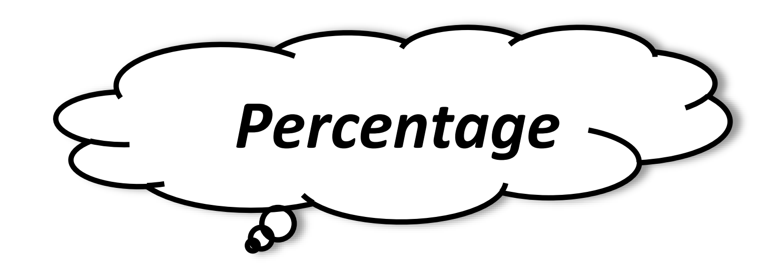
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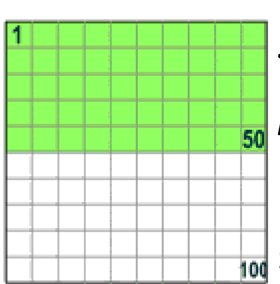




<u>Percentage</u> is a ratio with a second term of 100

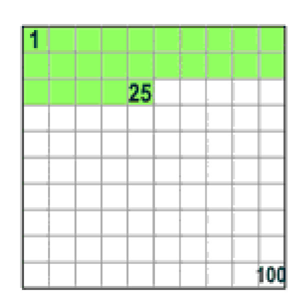
<u>Percentages (%)</u>

<u>When you say "Percent" you are really saying "per 100"</u>

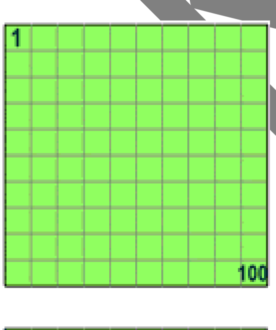


*So **50%** means 50 per 100 (50% of this box is green)*

*And **25%** means 25 per 100 (25% of this box is green)*



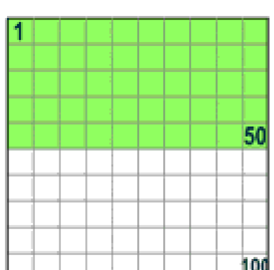
<u>Examples:</u>



100% means all.

Example:

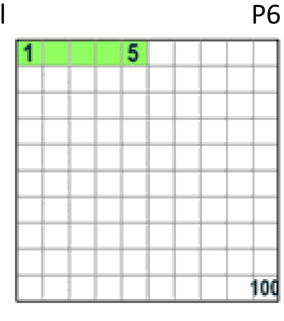
*100% of **80** is* $^{100}/_{100} \times 80 = 80$



50% means half.

Example:

*50% of **80** is* $^{50}/_{100} \times 80 = 40$



5% means $^{5}/_{100ths}$.

Example:

*5% of **80** is $^{5}/_{100} \times 80 = 4$*

Using Percent

Because "Percent" means "per 100" you should think "this should always be divided by 100"

*So **75%** really means $^{75}/_{100}$*

*And **100%** is $^{100}/_{100}$, or exactly **1** (100% of any number is just the number, unchanged)*

*And **200%** is $^{200}/_{100}$, or exactly **2** (200% of any number is twice the number)*

Use the slider on the left and try some different numbers (example, what is 40% of 80?)

A Percent can also be expressed as a Decimal or a Fraction

***A Half** can be written...*

As a percentage:	*50%*
As a decimal:	*0.5*
As a fraction:	$^{1}/_{2}$

Example: 15% of 200 apples were bad. How many apples were

bad?

15% = $^{15}/_{100}$

$(^{15}/_{100}) \times 200 = 15 \times 2 = 30$ apples

***30** apples were bad*

Example: if only 10 of the 200 apples were bad, what percent is that?

As a fraction, 10/200 = 0.05

As a percentage it is: (10/200) x 100 = 5%

***5%** of those apples were bad*

Example: A Skateboard is reduced 25% in price in a sale. The old price was $120. Find the new price

First, find 25% of $120:

25% = $^{25}/_{100}$

$(^{25}/_{100}) \times \$120 = \$30$

25% of $120 is $30

*So the **reduction** is $30*

Take the reduction from the original price

$120 - $30 = $90

*The Price of the Skateboard in the sale is **$90***

The Word

"Percent" comes from the latin Per Centum. The latin word Centum means 100, for example a Century is 100 years.

Percent* vs. *Percentage

*My Dictionary says "Percentage" is the "result obtained by multiplying a quantity by a percent". So 10 **percent** of 50 apples is 5 apples: the 5 apples is the **percentage**.*

But in practice people use both words the same way.

Decimals, Fractions and Percentages

Decimals, Fractions and Percentages are just different ways of showing the same value:

***A Half** can be written...*

As a fraction:	$^{1}/_{2}$
As a decimal:	*0.5*
As a percentage:	*50%*

***A Quarter** can be written...*

As a fraction:	$^{1}/_{4}$
As a	*0.25*

decimal:

As a percentage: *25%*

Example Values

Here is a table of commonly occuring values shown in Percent, Decimal and Fraction form:

Percent	***Decimal***	***Fraction***
1%	*0.01*	$^1/_{100}$
5%	*0.05*	$^1/_{20}$
10%	*0.1*	$^1/_{10}$
12½%	*0.125*	$^1/_8$
20%	*0.2*	$^1/_5$
25%	*0.25*	$^1/_4$
$33^1/_3\%$	*0.333...*	$^1/_3$
50%	*0.5*	$^1/_2$
75%	*0.75*	$^3/_4$
80%	*0.8*	$^4/_5$

90%	*0.9*	$^{9}/_{10}$
99%	*0.99*	$^{99}/_{100}$
100%	***1***	
125%	*1.25*	$^{5}/_{4}$
150%	*1.5*	$^{3}/_{2}$
200%	*2*	

Conversions

From Percent to Decimal

To convert from percent to decimal: divide by 100, and remove the "%" sign.

*The easiest way to divide by 100 is to **move the decimal point 2 places to the left**. So:*

From Percent *To Decimal*

75% 0.7.5 0.75

2 Places

*move the decimal point **2 places to the left**, and remove the "%" sign.*

From Decimal to Percent

To convert from decimal to percent: multiply by 100, and add a "%" sign.

The easiest way to multiply by 100 is to ***move the decimal point 2 places to the right****. So:*

From Decimal To Percent



move the decimal point ***2 places to the right****, and add the "%" sign.*

From Fraction to Decimal

The easiest way to convert a fraction to a decimal is to divide the top number by the bottom number (divide the numerator by the denominator in mathematical language)

Example: Convert $^2/_5$ to a decimal

Divide 2 by 5: 2 ÷ 5 = 0.4

Answer: $^2/_5$ = 0.4

From Decimal to Fraction

To convert a decimal to a fraction needs a little more work.

Example: To convert 0.75 to a fraction

Steps	***Example***
First, write down the decimal "over" the number 1	$^{0.75}/_{1}$
Then multiply top and bottom by 10 for every number after the decimal point (10	$^{0.75 \times 100}/_{1 \times 100}$

for 1 number, 100 for 2 numbers, etc)

(This makes it a correctly formed fraction) = $^{75}/_{100}$

Then Simplify the fraction $^{3}/_{4}$

From Fraction to Percentage

The easiest way to convert a fraction to a percentage is to divide the top number by the bottom number. then multiply the result by 100, and add the "%" sign.

Example: Convert $^{3}/_{8}$ to a percentage

First divide 3 by 8: 3 ÷ 8 = 0.375,
Then multiply by 100: 0.375 x 100 = 37.5
Add the "%" sign: 37.5%

Answer: $^{3}/_{8}$ = 37.5%

From Percentage to Fraction

To convert a percentage to a fraction, first convert to a decimal (divide by 100), then use the steps for converting decimal to fractions (like above).

Example: To convert 80% to a fraction

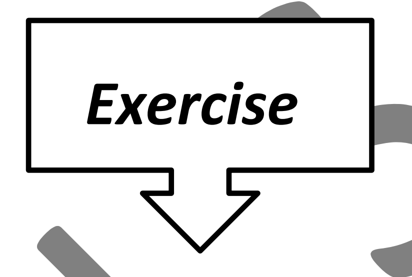
Steps	***Example***
Convert 80% to a decimal (=80/100):	*0.8*
Write down the decimal "over" the	$^{0.8}/_{1}$

number 1

Then multiply top and bottom by 10 for every number after the decimal point (10 for 1 number, 100 for 2 numbers, etc) $^{0.8 \times 10}/_{1 \times 10}$

(This makes it a correctly formed fraction) $= {}^{8}/_{10}$

Then Simplify the fraction $^{4}/_{5}$



1- Change each percentage to a fraction in its simplest form:

a- 21 % = ………………..

b- 4 % = ………………….

c- 120 % = …………….

d- 3/8 % =………………..

2- Change each percentage to a decimal :

a- 28 % = …………………

b- 73.2 % = ……………..

c- 60 % = ………………..

d- 1 % = …………………

3- which is greater ?

a- 0.05 or 6 %

………

b- 1.6 or 16 %

……………………………………………………………………………………………………….

c- 0.75 or 80 %

……………………………………………………………………………………………………….

d- *0.09 or 90 %*

……………………………………………………………………………………………….

4- <u>Change to a percentage:</u>

a) 0.6 = ………………………………………………………………………………………………….
b) 0.01 = ………………………………………………………………………………………………
c) 1.01 = ………………………………………………………………………………………………
d) 0.09 = ………………………………………………………………………………………………
e) 0.007 = ……………………………………………………………………………………………
f) 0.56 = ……………………………………………………………………………………………….
g) 0.2855 = …………………………………………………………………………………………
h) 0.25 = ……………………………………………………………………………………………..
i) 42 / 100 = ………………………………………………………………………………………
j) 8 / 10 = ……………………………………………………………………………….
k) 15 / 20 = ……………………………………………………………………………….
l) 3 / 8 = …………………………………………………………………………………….
m) 68 / 40 = ……………………………………………………………………………….
n) 3 / 5 = …………………………………………………………………………………….
o) 1 / 2 = …………………………………………………………………………………….

5- <u>Which is greater ?</u>

a- 1 /4 or 20 %

……………………………………………………………………………………………………….

b- 1 / 2 or 150 %

……

c- 5 / 8 or 6.25 %

……

d- 3 / 10 or 10 %

……

6- <u>Complete:</u>

a- 12 % +………% = 32 %

……

b- 2- 150 % =……..%

……

c- 15 % + 35 % + ……. = 1

……

d- 80 % + 0.5 = …………

7- Three-quarters of a glass is filled with water.

a- What percentage of the glass that is filled with water.

b- What percentage of the glass that is not filled with water.

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8- The ratio between the number of boys to the number of girls in a school is 7 : 3 Find :

a- The percentage of girls

b- The percentage of boys

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9-A school has 750 students. One day 150 students were absent Find the percentage of the attendees on that day and the percentage of the absent.

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10-There are 40 pupils in a class: 35 % of the pupils are girls. How many are there?

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11- If 30 % of a number is 45. Find the number.

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12- The percentage of success in a class was 91 % and the number of failed pupils was 18. How many pupils passed the exam?

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13- Sara types a story in 80 minutes. What is the time needed to type 25 % of the story?

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14- Ali's salary increased by 12 % to become L.E 560 .Find his salary before increase.

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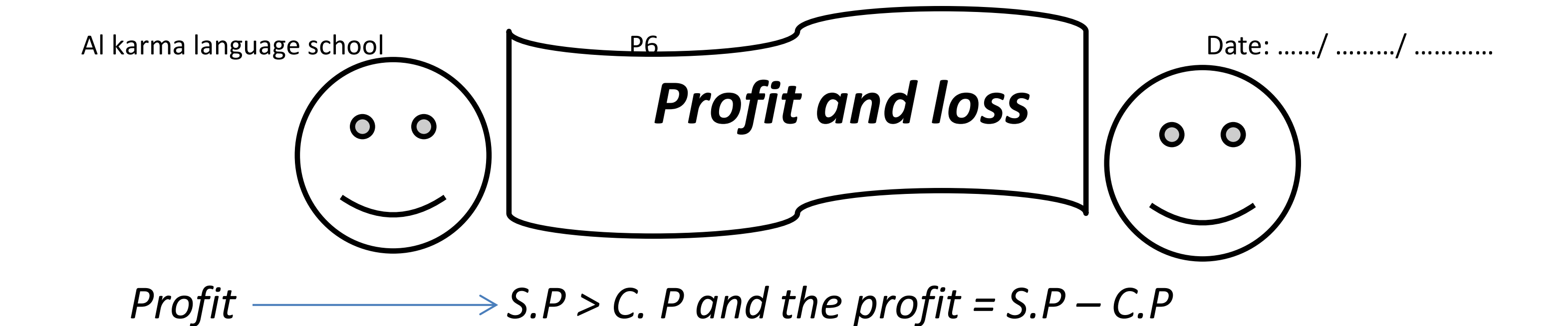
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15- In a sale a computer which was marked at L.E 4500 was sold for L.E 4250. Find the percentage of discount.

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Profit → *S.P > C. P and the profit = S.P – C.P*

Actual profit = selling price – cost price

$$\text{Profit \%} = \frac{Actual\ profit}{Cost\ price} \times 100\ \%$$

Loss → *C.P > S.P and the loss = C.P – S.P*

Actual loss = cost price – selling price

$$\text{Loss \%} = \frac{Actual\ loss}{Cost\ price} \times 100\ \%$$

Exercise

1- Rana bought a house for L.E 250000 and sold it for L.E 275000. Find her profit percent.

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2- Fady gains 12 % by selling a mobile phone for L.E 1344, how much did it cost him?

……………………………………………………………………………………………………..

3- A merchant bought a car for L.E 32000 and spent L.E 3000 for repairing it He sold it for L.E 28000. Find the percentage of his loss.

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4- A merchant bought a roll of coloured cloth 50 meters length for L.E 20 per meter .He sold 80 % of it for a profit of 10 % , the rest of the cloth was sold with a loss of 20 %.

a- Find the selling price of the whole roll.

b- Did the merchant gain or lose?

c- Find his percentage of profit or loss.

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5- Hany bought a camera with a discount of 20 % if its listed price was L.E 1500, find the money that Hany paid after the discount and find the discount.

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6- Haidy deposited L.E 1500 in a bank with an interest of 10 % yearly .Find the total amount that Haidy got at the end of the year.

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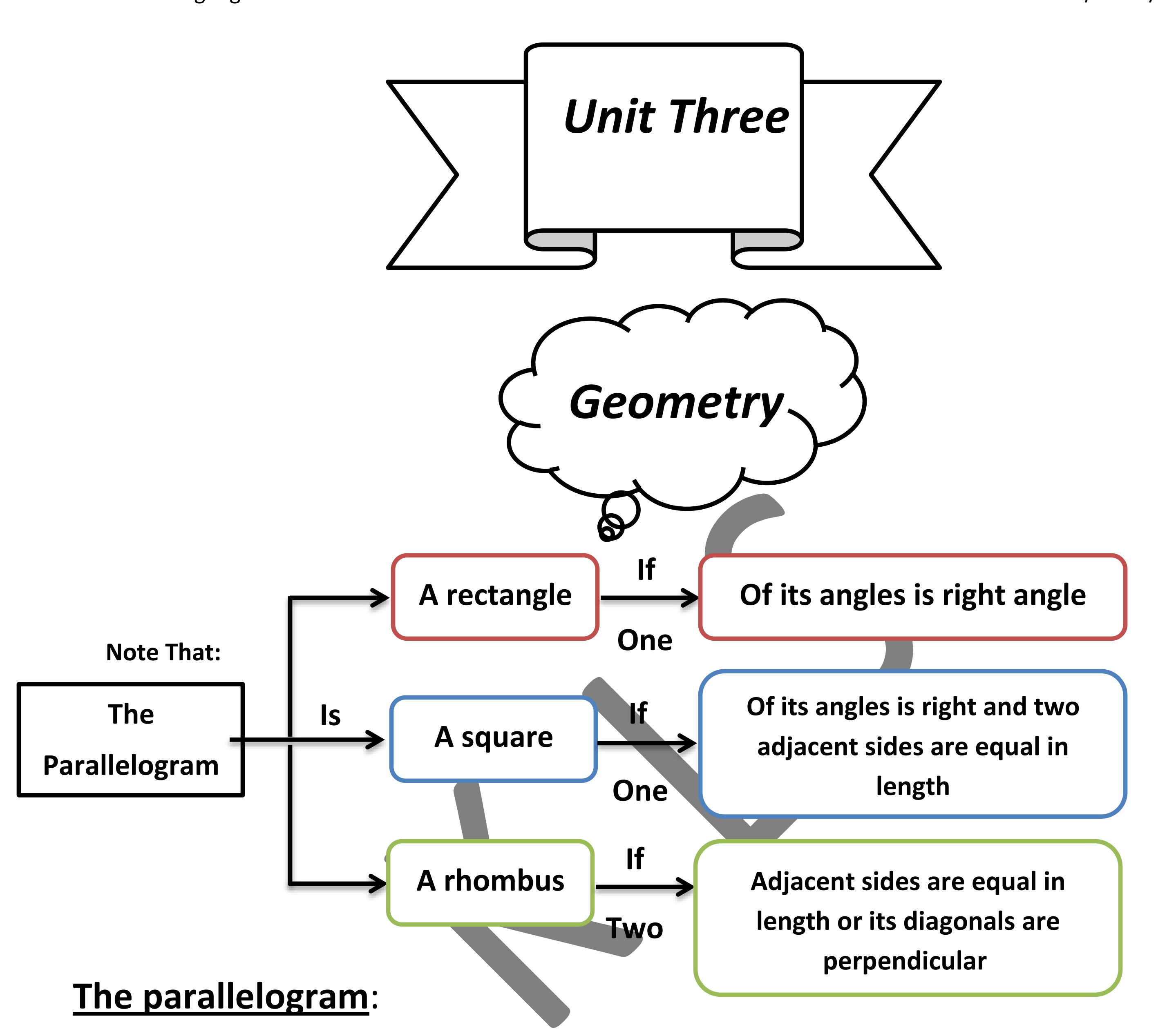
7- A man deposited L.E 25000 in a bank for an annual interest of 10 % Calculate the total capital at the end of the year. If he deposited the total capital in the same bank , find the capital at the end of the second year.

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The parallelogram:

Definition: it's a quadrilateral in which each two opposite sides are parallel.

Properties of the parallelogram:

1) Each two opposite sides are parallel and equal in length.
2) Each two opposite angles are equal in measure.
3) The sum of the measures of any two consecutive angles equals 180
4) The two diagonals bisect each other.

Perimeter of parallelogram $= (l + w) \times 2$

The rectangle:

Definition: it's a parallelogram in which one of its angles is right

Properties of the rectangle:

The rectangle has all the four properties of the parallelogram in addition:

1) All the angles are equal, each of them equals 90
2) The two diagonals are equal.

   Perimeter of rectangle = $(l + w) \times 2$

The rhombus:

Definition: it's a parallelogram in which two adjacent sides are equal.

Properties of rhombus:

The rhombus has all the four properties of the parallelogram in addition:

1) All the sides are equal in length.
2) The two diagonals are equal in measure.

The square:

Definitions:

1) It's a parallelogram with a right angle and two adjacent sides are equal in length.

2) it's a rectangle with two adjacent sides are equal.

3) it's a rhombus with a right angle.

Properties of square:

1) All the sides are equal in length.
2) All the angles are equal in measure, each of them equal 90
3) The two diagonals are equal and perpendicular.

Hint: the **trapezoid**: is a quadrilateral in which only two opposite sides are parallel.

Complete each of the following:

1- In rectangle, each two opposite sides are ……………….., ………………..
2- The four angles are right in each of ………………,…………………
3- In parallelogram, the sum of the measures of any two consecutive angles equals ………………..
4- Each two opposite angles are equal in ………………..,……………..,……………
5- If one of the angles of the parallelogram is right angle so the new shape is called ……………..
6-

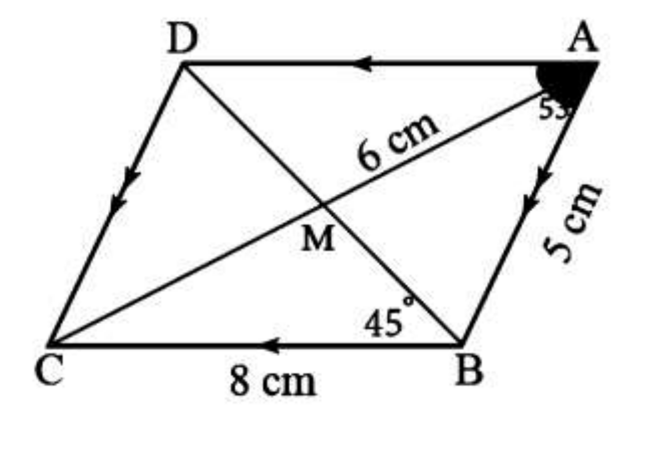
Calculate without using measuring tools each of

1- m (∠ ABD)

2- m (∠D)

3- AC

4- AD , DC using the properties of the parallelogram.



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7-

a) The four sides are equal in length in each of …. , …….

b) The two diagonals are equal in length in each of …., …..

c) The two diagonals are perpendicular in each of …… ,……

d) The four angles are right in each of ….. , …..

e) the two opposite angles are equal in each of ……,…… ,…..,…..

f) The two diagonals bisects each ether in each of ….., ….., ……

g) The sum of measures of the two consecutive angles equals 180° in each of …., ….., ……

8-

In the opposite figure

ABCD is parallelogram in which

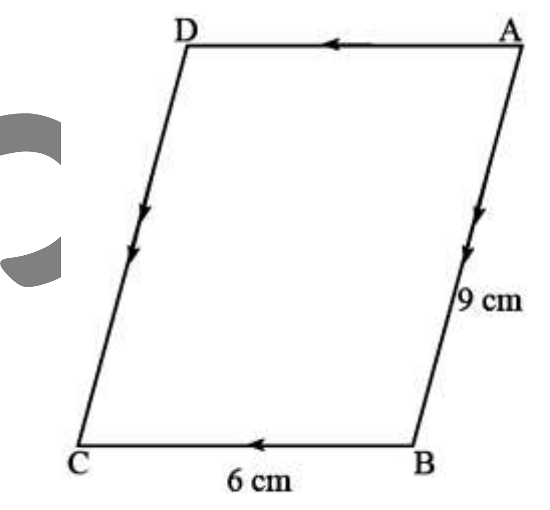
AB= 9 cm , BC = 6 cm . Determine the point X an the side $\overline{AB}$ such that AX=BC

And determine the point Y on the side $\overline{DC}$ such that DY = BC



Complete the following

- The figure AXYD represents ……. Because …….
- The figure ABCY represents ……. Because ……
- The figure XBCY represents ……. Because …….
- The type of the triangle AXY according to its sides is ……………… because ………………



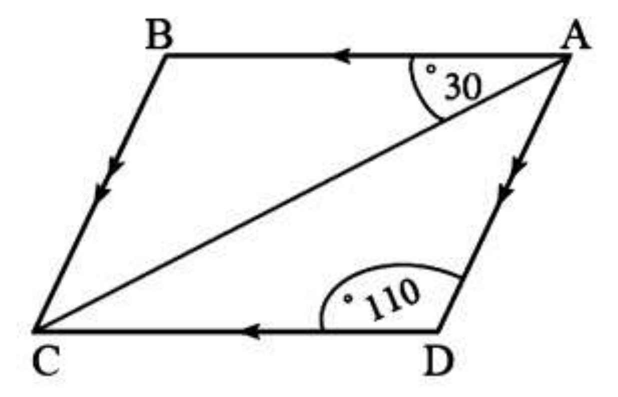
9-

In the opposite figure:

ABCD is a parallelogram in which

M (<BAC) = 30°, and m(<D) = 110°

Find m (<B), m(<BCA) and m (ACD)



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Volumes

- Km $\xrightarrow{\times 1000}$ m $\xrightarrow{\times 10}$ dm $\xrightarrow{\times 10}$ cm $\xrightarrow{\times 10}$ mm
- $m^2 \xrightarrow{\times 100} dm^2 \xrightarrow{\times 100} cm^2 \xrightarrow{\times 100} mm^2$
- $m^3 \xrightarrow{\times 1000} dm^3 \xrightarrow{\times 1000} cm^3 \xrightarrow{\times 1000} mm^3$

Convert each of the following:

a) 110 dm^3 = …….. cm^3.

b) 75000 mm^3 = …….. cm^3.

c) 12 m^3 = ……… dm^3 = ……….. cm^3.

d) 74 cm^3 = ………… mm^3.

e) 5278 dm^3 = ………… m^3.

f) 1.3 m^3 = …….. dm^3.

g) $100000000mm^3 = \ldots\ dm^3$

h) $67m^3$ = ……………… mm^3

i) 535 dm^3 = ……………..mm^3

Volume of cuboid

The cuboid has :

1) 6 faces (each face is a rectangle)
2) 8 vertices
3) 12 edges

Rules

1) Volume of cuboid = length × width × height **or** = base area × height
2) Base area = length × width
3) Volume of cuboid = base area × height
4) Base area = $\frac{\quad}{\quad}$
5) Length = $\frac{\quad}{\quad}$
6) Width = $\frac{\quad}{\quad}$
7) Height = $\frac{\quad}{\quad}$ $\frac{\quad}{\quad}$

Word problems:

1- The dimensions of a cuboid are 4 cm; 3 cm and 8 cm. *find its volume*.

……

2- *Which is greater in volume:* **a cuboid of dimensions 7 cm, 6 cm and 8 cm. or a cuboid of base area 30 cm² and its height 12 cm?**

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……

3- *Which is greater in volume,* **a cuboid of dimensions 50 cm, 35 cm and 40 cm. or a cuboid of base area 4200 and height 25 cm?**

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4- Calculate the base area of a cuboid of volume 1029 cm^3 and height 7 cm.

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5- *Calculate the base area* **of a cuboid of volume 1344 cm^3 and height 24 cm.**

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6- 8100 cm^3 of water are poured in a cuboid – shaped vessel with a square base of side length 15 cm. *Find the height* ***of water in the vessel.***

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7- 9000 cm^3 of water are poured in a cuboid – shaped vessel with a square base of side length 15 cm. *find the height* ***of the water in the vessel.***

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8- A cuboid – shaped box of dimensions 10 cm, 12 cm and 18 cm. was filled with pieces of sweets, each piece in the shape of a cuboid of dimensions 1 cm, and 2 cm. and 3 cm. *find the number* ***of the pieces that filled the box.***

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9- Find the price of the sand which fills a bed of a truck in the shape of a cuboid , its inner dimensions are 2.5 m , 1.6 m and 0.7 m. Knowing the price of one m^3 is 7.75 L.E.

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10- The inner dimensions of a box are 36 cm, 20 cm and 15 cm. if it's needed to fill with cuboid – shaped bars of soap of dimensions 6 cm, 5 cm and 5 cm. find the number of soap bars that can be put in the box.

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Volume of cube

The cube has :

4) 6 faces (each face is a square)
5) 8 vertices
6) 12 edges (all of them are equal)

Rules:

1) Volume of cube= edge × edge × edge (edge = side)
2) Perimeter of one face = side × 4
3) Area of one face = side × side

Exercises

1) ***Find the volume of the cube whose face area is: a) 25 cm² b) 49 cm².***

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………

2) ***If the sum of the edge lengths of a cube is 48 cm.*** *find its volume.*

………
………
………

3) *Find the volume* ***of the cube that the perimeter of one face is 26 cm.***

………
………
………

4) *Find the volume* ***of the cube that its edge length is equal to the side length if an equilateral triangle of perimeter 30 cm.***

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………
………

5) ***The edge length of a cube made of clay is 13.5 cm; the cube was cut into small cubes of edge length 1.5 cm each.*** *Find the number of* ***the small cubes.***

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………

6) A cube – shaped piece of metal, its edge length is 16 cm, was melted and turned into a number of small cubes, the edge length of each one is 8 cm. find the number of the small cubes.

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The capacity

1) A cubic vessel of internal side 20 cm. long find its capacity in liters.

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2) Two vessels , one is a cube with inner edge length 0.4 m and the other is a cuboid with inner dimensions 50 cm , 60 cm and 30 cm. find the difference between the two volumes.

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3) ***Two boxes, one is a cube with inner edge length 60 cm, the other is a cuboid with inner*** **dimensions 4 dm, 6 dm, and 8.5 dm.** find the difference **between the capacities of the two boxes in liters.**

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4) **If 500 cm^3 of a certain medicine are packed in small bottles and the capacity of each bottle is 100 mm^3.** Find the number of the needed bottles**.**

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Unit Four

Statistics

The Kinds of Statistics data

1- descriptive data : they are data written in the form of discribtion to the case of the persons in the society as : the favorite colour, favorite food, the birth place, the social case, the education case, profession case….. etc

2 - Quantative data : they are data written in the from numbers to express a certain phenomenon as: age , tallness, weight, the shoes size, number of sons, the student's mark in the examination …. Etc.

The Specialist Hospital

Requisition for medical examination

The name ……………………………………………………

The age…………………………………………………

Examination date / / 20

Sex male female

The birthday / / 20

The birth place…………………………………………………

The address…………………………………………………

The social status…………………………………………

The educational case……………………………………

The kind of disease……………………………………

The degree of disease…………………………………

The tallness…………………………………………………

The weight…………………………………………………

The temperature degree

Blood type

Which of this data is descriptive and which is quantitative?

A personal card of pupil

School name. ………………………………………

Name ………………………………………

Grade ………………………………………

Class: ………………………………………

School year ………………………………………

Birthday …………/………/……20………

Blood type

Tel. house…………………

mobile…………………

Personal Photo

Which of this data is descriptive and which is quantitative?

Exercise: all the following data are descriptive except

1) Name , favorite color , age , and blood type
2) Mobile number, personal photo , social status , and favorite food

Collecting descriptive statistic data

One of schools collected data about the kinds of stories book which the pupils borrow them from the story corner in the school library in a month of the year.

Through examining the borrow sheets which were 36 sheets, the resut was as follows.

drawing - reading - playing music - singing - acting - reading
playing music - drawing - acting - reading - playing music - playing music
acting - singing - reading - drawing - acting - drawing
singing - playing music - drawing - acting - drawing - reading
reading - drawing - acting - reading - drawing - singing
drawing - reading - singing - acting - drawing - playing music



Form a simple frequency table for the previous descriptive data. Then answer the following questions.

- What are the kinds of the stories which are the most attractive for the pupils? Express that by its percentage?

- What are the kinds of the stories which are the least attractive for the pupils? Express that by its percentage?

- What is your advice to the director of the library?

- What is your advice to your fellow pupils who go to the library repeatedly ?

Kind of stories	Tally	Frequency
Drawing		
Reading		
Action		
Playing music		
Singing		

……

……

If the public score of 40 students in Arabic language in a university is as follows.

very good - good - pass - good - excellent - good - good

very good - good - very good - good - good

excellent - very good - excellent - excellent - pass

good - good - very good- good - pass

very good - very good - good - very good- pass - good

very good - good - pass - very good - excellent

pass - pass - excellent - good - pass

Form the Tally frequency table. Then form the frequency table for the previous results then answer the following questions.

- What is the most common score of the students?
- What is the least score of the students?
- What is your advice to the students In this important educational stage?

Scores	Tally	Frequency
Excellent		
Very good		
Good		
Pass		

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Collecting The statistics quantative data.

Range = highest value – lowest value

$$\text{The number of sets} = \frac{\text{the range}}{\text{the length of set}}$$

2 the following frequency table of sets show The shares of money in pound hold by the pupils of a class in the project of building a hospital near to the school study it and answer.

The shares in pounds	20-	30-	40-	50-	60-	70-	Total
Number of pupils	3	6	8	12	7	4	40

1 - what is the number of pupils who shared with an amount of money lies between 40 and 50 pounds?

2 - what is the number of pupils who shared with the least amount of money what is their percentage?

3 - what is the number of pupils who shared with an amount of money = 60 pound and more ? what is their percentage?

4 - what is the least share hold by the pupils? And what is their number in each case?

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Representing the Statistics Data by the frequency curve

Center of the set = $\frac{lower\ limit + higher\ limit}{2}$

1 the following table shows the extra money which 100 workers got in a month in a factory . they are as follows.

The extra money	20-	30-	4-	56-	60-	70-	Total
Number of workers	20	15	30	20	10	5	100

- what are the number of workers who obtained extra money less than 50 pounds.
- Draw the frequency curve of this distribution.

Sets	Center of the set	Frequency

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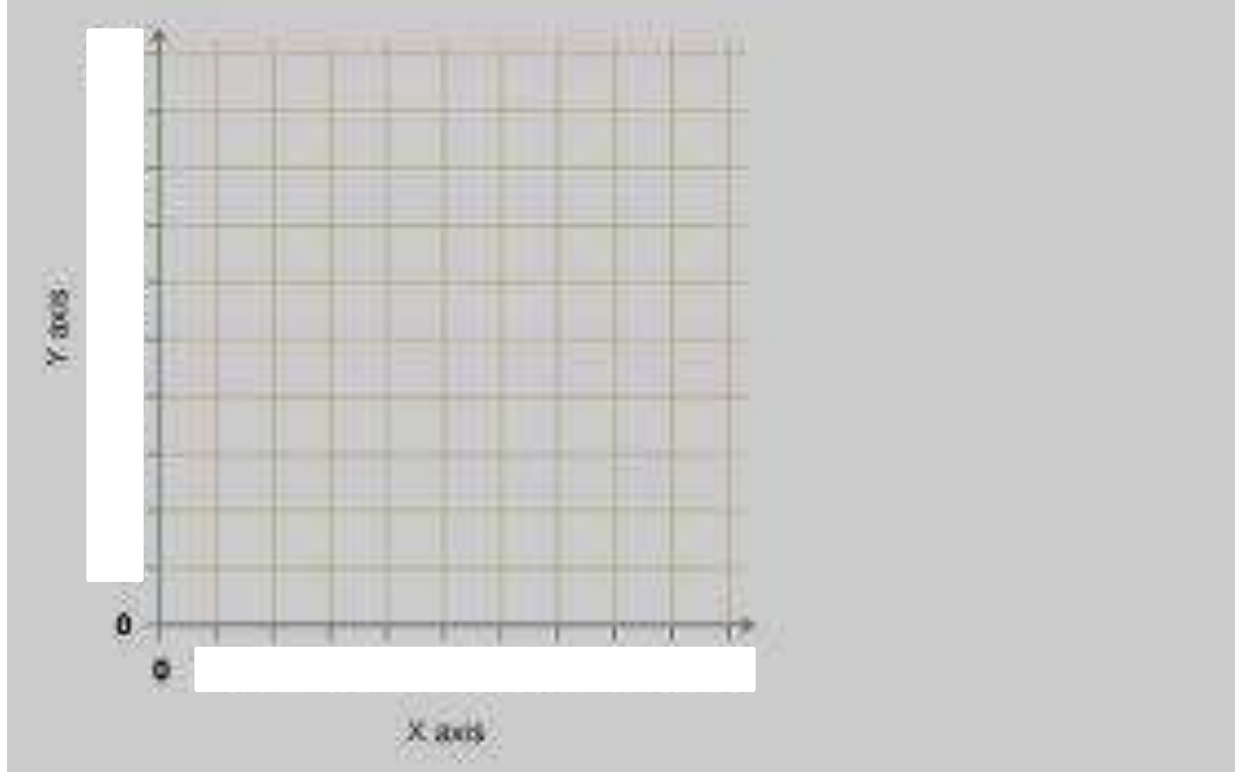

In a goodness party for orphan's day A group of contributors paid sums of money in pounds as shown in the following table.

The sum	50-	60-	7-	80-	90-	100-	110-	Total
Number of contributors	5	7	10	12	10	7	5	

- what is the number of contributors by L. E 80 and more.?
- Represent the previous data by the frequency curve.

Sets	Center of the set	Frequency

………



3) The following table shows the marks for 100 students in one month in math.

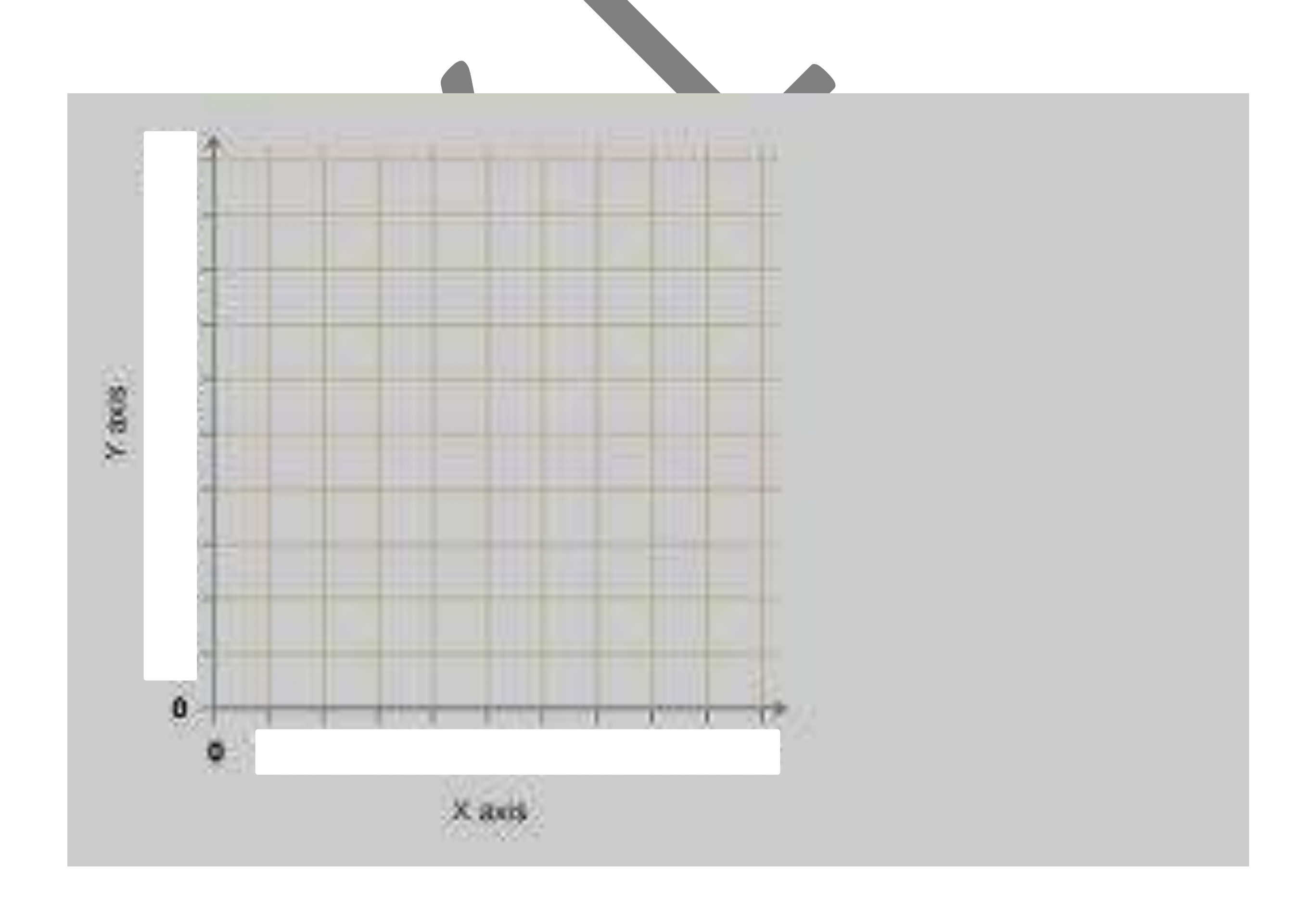
Marks	20 -	30 -	40 -	50 -	Sum
Number of students	15	30	40	15	100

a) What is the number of students who records less than 40 marks?

b) Draw the frequency curve for this distribution.

………

Sets	Center of sets	Frequency



4) On the orphan day a group of students donated amounts of money in pounds shown in the following table:

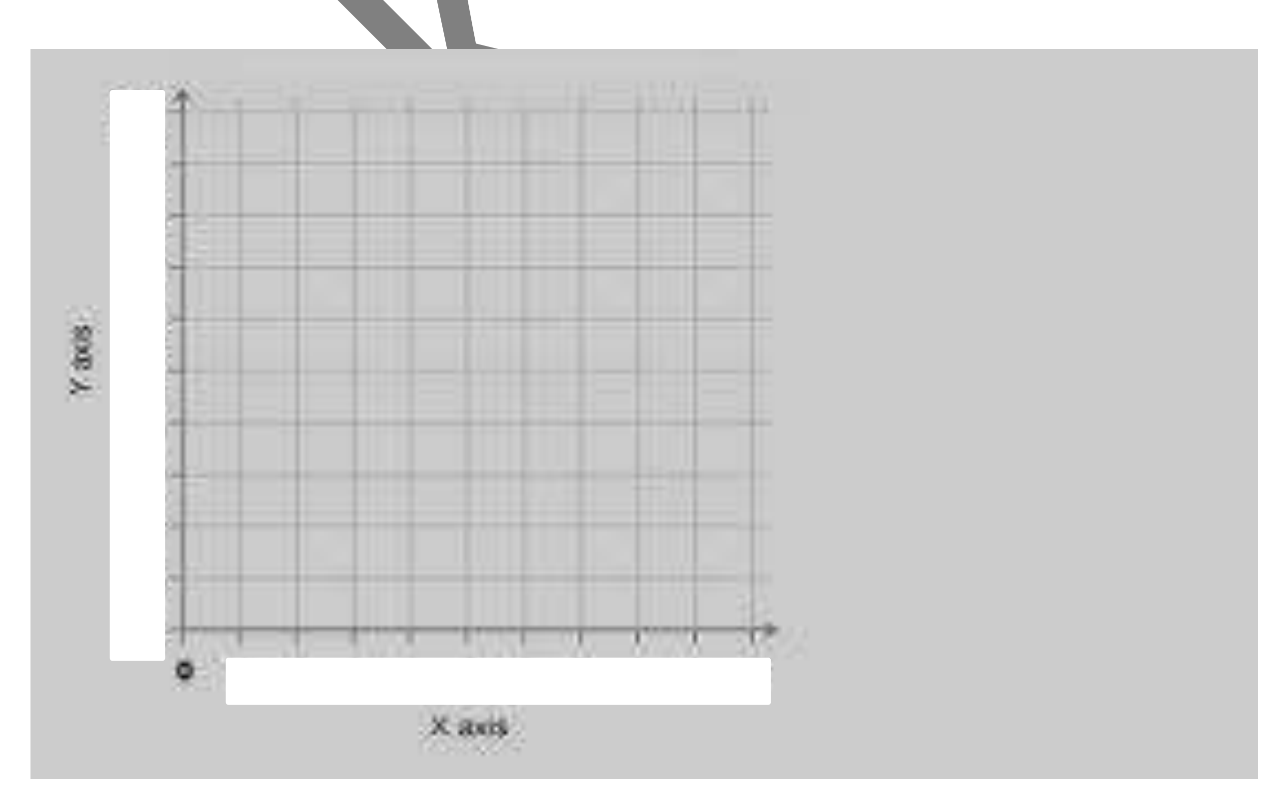
Money in pounds	3 -	5 -	7 -	9 -	11 -
Number of students	7	10	15	10	8

a) What is the number of students who donated by 7 pounds and more?

b) Draw the frequency curve for this distribution.

………

Sets	Center of sets	Frequency



5) The following table shows the marks of 40 students in one month in math

Marks	10 -	20 -	30 -	40 -	50 -
Number of students	4	8	12	10	6

a) Draw the frequency curve for this distribution.

6) On the orphan day a group of students donated amounts of money in pounds shown in the following table:

Money in pounds	3 -	5 -	7 -	9 -	11 -
Number of students	7	10	15	10	8

a) What is the number of students who donated by 7 pounds and more?

b) Draw the frequency curve for this distribution.

7) The following table shows the marks of 50 students in one month in math

Marks	10 -	20 -	30 -	40 -	50 -
Number of students	6	12	14	12	6

a) What is the number of students who record less than 40 marks?

b) Draw the frequency curve for this distribution.